CITY OF NEW BRUNSWICK
COMPREHENSIVE TECHNICAL ASSISTANCE (CTA)
MONTHLY PROGRESS REPORT

TO: FRANK J. MARASCIA

FROM: HOWARD J. WOODS, JR., P.E.

SUBJECT: MONTHLY REPORT FOR MARCH 2014

DATE: APRIL 14, 2014

I. PERFORMANCE LIMITING FACTORS DEFINED IN THE COMPREHENSIVE PERFORMANCE EVALUATION

A. ADMINISTRATION – POLICIES ADMINISTRATION (A)

1. Adopt Plant Performance Goals

During the month of March, gravity filters No.1 through No. 4 were returned to service at an average loading rate of 3 gpm/sf. This represents an output of 6 Million Gallons per Day (MGD) and it is less than the rated output capacity of 8 MGD for four filters. This provides additional capacity to meet emergency water demands in the service area. Performance for the month was strong and within the newly determined operating goals for the plant. Filters were backwashed after 24 hours of service. At this point, the effluent turbidity had consistently remained below the operational upper limit of 0.35 NTU.

At the conclusion of the Comprehensive Performance Evaluation, the plant adopted a settled water turbidity goal of 1.0 NTU. While this goal can be met most of the time, operations through the winter months demonstrate that occasional changes in raw water quality can result in higher settled water turbidity. Plant operating guidelines have been developed to shift production from the gravity filters to the membrane filters under such abnormal conditions. While this results in increase treatment expense, it provides greater assurance that plant output water quality can be maintained at the highest levels. When raw water quality improves to normal conditions, the operating guideline allows gravity filtration to increase to normal output levels. This reduced wear and tear on the membranes, which extends the life of the membranes and reduces ongoing operating expense.

The adoption of plant performance goals that are more stringent than the water quality requirements of the Safe Drinking Water Act regulations resolves the issue raised in the CPE report. This provides a sufficient factor of safety between day-to-day performance and the maximum compliance limits specified in the regulations.

2. Outdated or Inadequate Continuous Monitoring Equipment

Since the issues with plant performance were first identified in 2013, the City has installed new turbidimeters on all eight gravity filters, installed a streaming current monitor to provide improved control of the coagulation process, installed a new continuous chlorine residual analyzer near the high service pumps, and installed an additional chlorine residual analyzer and a redundant chlorine feed line at the head of the chlorine contact basin.

Poor weather conditions in March caused the installation of new loss-of-head gages to be rescheduled for April.

The old turbidimeters for Filter Nos. 1 and 2 were calibrated and plumbed to the filter to waste lines to give the operators real-time data on the turbidity in the filter to waste line. This provides additional information that can be used to determine the length of the ripening period. The information gathered from monitoring Filter Nos. 1 and 2 over the coming months will be used to determine if it is necessary to outfit Filter Nos. 3 through 8 in a similar manner and if it is possible to modify the operating guidelines for the filter-to-waste cycle length. The existing combined filter effluent turbidimeter will be relocated to a more representative location to provide an accurate measure of the combined filter effluent turbidity for only the gravity filters.

A more detailed evaluation of the plant SCADA system has been completed and it has been determined that the SCADA system is inadequate and should be replaced. The existing system does not have adequate redundancy to assure that the historical operating data will be properly stored for later recovery. A new SCADA system is being installed and should be operational by the end of April. At that point, parallel operations of the old and new SCADA system will begin. Parallel operations will be maintained until the new SCADA system is fully commissioned and at this point, the old SCADA system will be retired. The estimated cost of the new SCADA system is $187,000.

3. Delayed Maintenance

The City has restructured the water treatment plant staff and designated an employee to be responsible for all maintenance planning. "Maintenance Connection" has been acquired and is being used to develop a programmed and preventative maintenance system. The development and use of programmed and preventative maintenance procedures addresses the concern raised in the CPE report. The implementation of "Maintenance Connection" will be an ongoing activity.

4. Lack of Safety Equipment

The City requested a survey of the plant by P-OSHA. An inspection was completed and the recommendations have been implemented. Appropriate personal safety equipment has been acquired and the operators have been trained in the use of the equipment when conducting maintenance and operating activities.

B. SUPERVISION – ADMINISTRATION (A)

These organizational changes put in place through early December resolve the organizational issues identified in the CPE report.

C. WATER TREATMENT UNDERSTANDING – OPERATIONS (A)

In-service training of the plant operations and maintenance staff is now being performed by the newly installed operations staff management team. This training is also being supplemented by periodic visits by the CTA consultants.

The CTA will focus additional attention on pre-treatment, coagulation and sedimentation operations in the remaining month of the project.

D. DATA INTEGRITY – OPERATIONS (B)

The installation of a new SCADA system is in progress. The grab sampling routine in the plant has been completely reviewed and revised. In addition, the operator log sheets have been reviewed and updated. The use of the new log sheets will be coordinated with the commissioning of the new SCADA system.

E. OPERATING GUIDELINES – OPERATIONS (B)

A template for the plant operating guidelines has been developed. Since the start of the CTA, the plant operations staff has been developing operating criteria and objectives for various elements of the plant. For example, guidelines for the duration of filter runs and IFE turbidity breakthrough have been established. As the guidelines are proven by several months of operating experience, they will be committed to paper in the form of a written series of Standard Operating Procedures. The operations staff recognizes that the development and use of operating procedures will be an ongoing activity designed to continuously improve plant performance.

F. MAINTENANCE – MAINTENANCE (B)

The City purchased and installed replacement membranes as needed to address membranes that could not meet appropriate pressure criteria. This work is complete.

All filtered water effluent valves have now been replaced. The old and unused surface wash sweeps have been removed from the filter boxes. A plan is being developed to replace the filter-to-waste, influent, backwash and drain line valves and the older valve actuators that remain in service. The replacement of additional vales and actuators and the replacement of media in all eight filters will be prioritized and addressed in the City's next update to its water system Master Plan.

The gravity filters were completely renovated in 2002. Detailed filter inspections demonstrate that the existing filter media is adequate and close to the original installation specification. Prioritization of the media replacement will be addressed in the Master Plan update and scheduled when needed.

G. REPRESENTATIVE SAMPLING – OPERATIONS (B)

A new CFE turbidity monitoring location will be created to provide a more representative CFE result for the gravity filters prior to introduction of water from the membrane filters. Once this is done, independent CFE reports for the membrane filters and for the gravity filters will be prepared. This will provide better operational control for the plant as a whole. The existing combined CFE monitoring point will be maintained for operational control as this point does provide a representative monitoring point for all water produced and delivered from the plant. These modifications will be coordinated with the SCADA improvements and the gravity filter improvements.

ATI probe-type turbidimeters will be installed at the outlets to the two sedimentation basins. The devices have been received on site. The purpose of these two monitoring points is to give the operators real-time knowledge of the quality of the effluent leaving each individual sedimentation basin prior to the addition of lime. This will provide better operational control of the sedimentation process. The current monitoring point will continue to provide data that reflects the turbidity of the combined settled water after lime addition and prior to filtration.

A sample pump and pH probe will be installed to link pH to the operation of the streaming current monitor to provide better control of the coagulation process. The pH probe has been received on site.

H. COMPENSATION – ADMINISTRATION (B)

The Utility Director has developed a modified compensation plan and submitted this plan to the City Business Administrator. Once the plan is finalized, it will be incorporated into the City's annual operating budget. A pilot proposal for training and licensing incentives is currently being developed by the Utility Director.

II. ADDITIONAL ISSUES DEFINED DURING THE CTA

A. LIME ADDITION RELIABILITY

During the CTA, reliability issues associated with the lime feeders have been identified. Lime addition will be continued for the foreseeable future. Programmed and preventative maintenance will address the reliability issues normally found with lime addition. The Master Plan update will provide a detailed evaluation of potential alternatives to lime addition. No further attention to this issue is needed in the CTA.

B. POTASSIUM PERMANGANATE FEED

Inspections of various elements of the plant show some evidence of manganese staining. The gravity filter inspections show that manganese has deposited on the media. The presence of a manganese coating on the media is likely helping to remove manganese in the treatment process and this would serve to reduce the potential for customer complaints. The potassium permanganate feed at the intake will be restored and this equipment is expected to be operational in April.